

# PATENT SPECIFICATION

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## (54) A PROCESS FOR MANUFACTURING PAPER FOR CIGARETTE FILTERS

(71) We, CESKOSLOVENSKA AKADEMIE VED, a Czechoslovakian Body Corporate, of No. 3 Narodni, Prague 1, Czechoslovakia, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to a process of manufacturing paper for cigarette filters.

Cigarette filters have been made from two basic raw materials, namely, from modified cellulose (e.g. viscose and cellulose acetate) or from paper. There are known also combined filters; thus, e.g. the paper may be manufactured with the addition of fibres other than cellulose, or various chemicals are added to the filter material with the object of increasing its adsorptive capacity.

Furthermore, the filter paper may be subjected to longitudinal or cross creping, brushing, or crimping. A portion of cellulose in the filter paper may be replaced by recovered cellulose fibres or synthetic fibres to increase the adsorptive capacity of the paper to the tar constituents of the tobacco smoke. The addition of active charcoal to cigarette filter paper is known to increase the effectiveness in removing the tars but may also have an adverse effect on the taste of the filtered smoke.

The active charcoal may be added in a divided form within the paper mass during the manufacturing process, or may be placed separately in the form of granules between two filter plugs (three-section filter) or between the filter plug and tobacco (two-section filters). The surface of the filter paper or a part of it may be coated with active charcoal by printing.

An object of the present invention is to obviate or mitigate the difficulties presented by materials of the prior art.

According to the present invention there is

provided a process of manufacturing paper for cigarette filters, wherein particles of active carbon and silicic acid gel are mixed with paper fibre. 45

By virtue of the present invention there is made available a process of manufacturing paper for cigarette filters, having a high adsorptive capacity for disagreeable and harmful constituents of tobacco smoke without producing any adverse effect on the taste of the filtered smoke. 50

Preferably the active carbon and silicic acid gel particles are in the form of an active carbon-bearing silicic acid gel matrix having a particle size of from 30 to 300 microns, and preferably the matrix is added to a mass of paper fibre in the ratio of 1 to 50% by weight based on the dry weight of the paper fibre, which may consist of a mixture of bleached or refined cellulose and recovered or synthetic fibres. The paper fibre, after mixing with the active carbon and silicic acid gel, may be processed by known procedures, for example, by longitudinal or cross creping in the dry or wet state, or by two-sided brushing. 55

Thus, the paper, according to the present invention, may be manufactured by addition of an active carbon-bearing silicic acid gel matrix to a mixture of bleached or refined cellulose and recovered or synthetic fibres. Paper made of this mixture shows a mechanical strength sufficient for any further processing necessary. The quantity of the particles used depends on the length and shape of the desired filter plug and the quality of tobacco. Preferably the weight of the paper is within the range from 25 to 45 grams per square metre. The whole filter plug or only part of it may be made from the material prepared according to the present invention. 60

The present invention further provides a paper manufactured by the process aforesaid, a cigarette filter manufactured from the 65

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paper aforesaid, and a cigarette including the said filter.

The superiority of the filter prepared from paper manufactured according to the present invention over a filter of the same material which lacked the active carbon bearing silicic acid gel matrix particles, was shown by ultraviolet absorption spectroscopy: 74% of the disagreeable and harmful constituents of tobacco smoke were found to be removed in the case of a filter prepared according to this invention, and only 51% in the case of a paper manufactured according to a hitherto used method.

15 The invention is further illustrated in the following examples, although it is not to be limited thereto.

**EXAMPLE 1:**

A mixture of bleached and recovered cellulose fibres is treated with 10% (by weight referred to the dry weight of the fibres) of silicic acid gel matrix particles containing 20% (by weight) of finely dispersed active carbon and 80% (by weight) of silicic acid gel, the size of the said gel particles being from 150 to 200 microns. The weight of the paper manufactured from the mixture is approximately 30 grams per square metre. The paper is worked up by longitudinal creping in the dry state.

**EXAMPLE 2:**

A mixture of refined cellulose and synthetic fibres is treated with 5% by weight referred to the dry weight of the fibres) of silicic acid gel matrix particles containing 43% (by weight) of finely dispersed active carbon and 57% (by weight) of silicic acid gel, the size of the said particles being from 50 to 150 microns. The paper is then subjected to two-sided brushing and creping in the dry state.

**WHAT WE CLAIM IS:—**

1. A process of manufacturing paper for cigarette filters, wherein particles of active carbon and silicic acid gel are mixed with paper fibre. 45
2. A process according to Claim 1, wherein the size of said particles is from 30 to 300 microns, and the particles of active carbon are uniformly distributed through the silicic acid gel. 50
3. A process according to Claim 1 or Claim 2, wherein a matrix of the said particles is added to the paper fibre in a quantity of from 1 to 50% by weight referred to the dry weight of the paper fibre. 55
4. A process according to any one of the preceding claims, wherein the paper fibre comprises a mixture of bleached or of refined cellulose with recovered or synthetic fibres. 60
5. A process according to any one of the preceding claims, wherein the paper fibre, after mixing with the active carbon and silicic acid gel, is processed by longitudinal creping or cross creping, in a wet or dry state, or two-sided brushing. 65
6. A process according to Claim 1, of manufacturing paper for cigarette filters, substantially as hereinbefore described. 70
7. A process according to either of the Examples.
8. Paper whenever prepared by the process claimed in any one of the preceding claims.
9. A cigarette filter manufactured from the paper claimed in Claim 8. 75
10. A cigarette containing the filter claimed in Claim 9.

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